

REMARKS

In support of allowance, applicants have the following comments.
Claims 1-7 remain pending in this application.

I. Priority

The office action states that a listing of the "prior filed" PCT Application Serial No. PCT/US03/38538 must be included in the first sentence of the specification. The instant application was filed on December 4, 2003 claiming priority back to Provisional Application Serial No. 60/430,865 (filed on December 4, 2002). PCT Application Serial No. PCT/US03/38538 was also filed by applicants on December 4, 2003 claiming priority back to Provisional Application Serial No. 60/430,865. The instant non-provisional does not claim priority back to PCT Application No. PCT/US03/38538.

Therefore, a reference in the specification is not needed nor is it appropriate. In a telephone conference on May 15, 2006, Examiner Mazumdar agreed that such a statement was not needed and offered to withdraw it. Applicant kindly requests that paragraph 1 of the office action be withdrawn.

II. Double Patenting

The office action states that claim 1 and 7 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 10 of co-pending Application Serial No. 10/097,717 in view of Usuki et al. (US 6316385).

The office action states that such a double patenting rejection can be overcome by the filing of a terminal disclaimer. Accordingly, applicants

submit the enclosed terminal disclaimer and fee, signed by the attorney of record, along with a power of attorney signed by the inventors herein.

It should be noted that the cited commonly owned Serial No. 10/097,717 has now been allowed and will mature into U.S. Patent No. 7137426 on November 21, 2006. However, at the time of execution of the attached terminal disclaimer, the commonly owned application is still pending. Thus, a terminal disclaimer for a pending reference application is submitted.

In view of the submission of a terminal disclaimer, copending and commonly owned Serial No. 10/097,717 is no longer available as a reference. Thus, the combination of Serial No. 10/097,717 and Usuki et al. cannot meet the limitations of claims 1 and 7. Applicant kindly requests that the double patenting rejection be withdrawn.

III. Rejection of Claims 1 and 7 Under Section 103(a)

The office action states that claims 1 and 7 are rejected as being unpatentable over US 2002/013062 in view of Usuki et al. and Rees.

US 2002/0131062 is merely the published copy of Serial No. 10/097,717 cited above. In view of the filing of the terminal disclaimer, applicants submit that US 2002/0131062 is also not available as a prior art reference. Thus, the combination of US 2002/0131062, Usuki et al. and Rees cannot meet the limitations of claims 1 and 7.

IV. Rejection of Claim 1, 2, 5, 6 and 7 under Section 103(a)

The office action states that claims 1, 2, 5, 6 and 7 are rejected under Section 103(a) as being unpatentable over the combination of Hastie et al. in view of Usuki et al., Rees and Durand.

The office action asserts that Hastie et al. teach a method of printing an image onto a three-dimensional surface where a printed transfer element is placed over the object for transfer thereto using heat and vacuum. However, Hastie et al. is devoid of the particular composition required by the claims of the present invention. Usuki et al. and Rees are cited for purposes of teaching the use of an ionomer film (such as Surlyn) and Durand is cited for the teaching of transfer printing using radiant heating elements for transfer of the dye to article. It is stated that it would be obvious for Hastie et al to use the transfer element composition of Usuki et al. and Rees and the transfer printing method of Durand to arrive at applicants' invention.

Applicants' claimed invention is directed to a method of applying a dye image to the surface of three dimensional object where a flexible dye image sheet includes a dye-receptive coating to receive a dye image thereon. The transfer element sheet is placed over the object and a flexible membrane provides a vacuum and heat is applied to cause the dye to transfer to the object. To achieve superior results over prior art methods of printing to non-flat three dimensional objects, a new transfer element construction is provided and employed in the instant method, which is set forth in detail in independent claim 1 in subsection (b) thereof. This new dye image carrier sheet is formulated to be flexible so that it may conform to a three

dimensional object, such as to three sides, under the strain of vacuum pressure and heat.

Applicants' submit that the combination proposed by the examiner is untenable and is the result of hindsight reconstruction of applicants' invention. First, the office action states that it would be obvious to combine the teaching of Hastie with Usuki et al. and Rees. Applicants disagree. Hastie teaches a method of printing an image onto a three-dimensional surface where the supporting base film is amorphous poly ethylene terphthlate rather than the ionomer (Surlyn) base film as claimed in applicants' claim 1.

Usuki et al. teaches the use of ionomers as a possible base substrate for a thermal transfer dye-receptive sheet. However, Usuki et al's transfer sheet is used in an environment and for a purpose that is very different that that disclosed in Hastie and in the present invention. More specifically, Usuki et al. employs an ionomer carrier film for printing using the thermal head of a printer as the heating means for transferring large number of dots to an image receiving sheet. Thus, Usuki et al. is clearly meant for printing photographs and other two dimensional images. In this environment, the transfer element is not placed under strain as it is simply passed underneath a thermal print head. Usuki's transfer element need not be flexible. Usuki et al is devoid of any teaching that the transfer element is flexible and capable of conforming about an object when subject to a vacuum and heat. This is completely unlike the three-dimensional printing about an object, such as

onto multiple surfaces where none of them are in the same plane, as described in detail in applicants' specification.

There is no suggestion or teaching in Usuki et al. or Hastie to suggest that the substrate sheet of Usuki et al. is capable of being used in a three dimensional printing environment. Applicant submits that the formulation and construction of Usuki et al's substrate sheet is not suitable for such three-dimensional conformation for three-dimensional printing. Applicant submits that Hastie could not employ the base element of Usuki et al. in a three dimensional environment because such an element would not work properly for three-dimensional transfer because it would not be flexible enough and would not sufficiently absorb radiation, such as infrared, like applicants' element would to protect the underlying object. Moreover, Usuki et al. fails to teach the use of the specific material claimed by applicants, such Surlyn.

Rees is also cited for the general teaching of the existence of Surlyn. The office action merely states that Rees teaches an ionomer film known as Surlyn with a chemical composition similar to that disclosed in claim 1 in the instant application. Applicant does not dispute that Surlyn or the specific composition in claim 1 already exists in the industry of polymers. What applicant does dispute is the use as a critical part of a three dimensional thermal printing method. The cited prior art references are completely devoid of any teaching, suggestion or motivation for employing a Surlyn film layer as a transfer element in three dimension thermal printing.

For example, the cited Hastie reference employs a sheet of amorphous poly ethylene terephthalate as part of its transfer sheet (see page 3, lines 22-23). This material is completely different with different physical properties than the composition found in Surlyn. There is no suggestion or teaching in Hastie why it would want to swap out poly ethylene terephthalate and replace it with a Surlyn-like material. There is no suggestion or teaching in Hastie why it would want to use Surlyn for its flexibility and infrared absorbing characteristics. Similarly, none of the other cited reference include a teaching or suggestion to support the use of Surlyn in this particular application of three dimensional thermal printing.

Durand is cited for the teaching of use of a flexible vacuum sheet and infrared heaters. There is no suggestion or teaching in the references to use such infrared heaters and vacuum as well as a Surlyn-like material in the transfer element. Thus, Durand is not combinable with Hastie, Usuki et al. and Rees.

In view of the foregoing, Hastie is not combinable with Usuki et al., Rees and Durand to arrive at applicants' invention in claims 1, 5, 6 and 7. Therefore, applicant submits that the rejection of claims 1, 5, 6 and 7 under Section 103(a) cannot be maintained and that claims 1, 5, 6 and 7 are patentable over the cited art.

V. Rejection of Claim 2 under Section 103(a)

The office action states that claim 2 is rejected under Section 103(a) as being unpatentable over the combination of Hastie et al. in view of Usuki et al., Rees, Durand and Williams.

Williams is further cited for the teaching of providing an additional optional barrier sheet on the transfer element. While optional barrier sheets are known, applicants contend that the method of the present invention that uses a transfer sheet of a Surlyn-like material for three dimensional thermal printing with such a barrier sheet is not known in the art. As a whole, the present method is not taught or suggested by the cited art. Therefore, the combination above cannot be maintained against claim 2. As a result, claim 2 is allowable.

Moreover, claim 2 is a dependent claim which is dependent on now allowable independent claim 1. Therefore, applicant submits that claim 2 is now allowable over the cited prior art.

VI. Rejection of Claim 3 under Section 103(a)

The office action states that claim 3 is rejected under Section 103(a) as being unpatentable over the combination of Hastie et al. in view of Usuki et al., Rees, Durand and Narita.

Narita is further cited for the general teaching of pigments in the dye-receptive layer. While dye-receptive layers with pigments therein are known, applicants contend that the method of the present invention that uses a transfer sheet of a Surlyn-like material for three dimensional thermal printing with such a dye-receptive sheet with pigments is not known in the art. As a whole, the present method is not taught or suggested by the cited art. Therefore, the combination above cannot be maintained against claim 3. As a result, claim 3 is allowable.

Moreover, claim 3 is a dependent claim which is dependent on now allowable independent claim 1. Therefore, applicant submits that claim 3 is now allowable over the cited prior art.

VII. Rejection of Claim 4 under Section 103(a)

The office action states that claim 4 is rejected under Section 103(a) as being unpatentable over the combination of Hastie et al. in view of Usuki et al., Rees, Durand and Gibbs et al.

Gibbs is further cited for the teaching of the use of silicone rubber as the flexible membrane for establishing a vacuum. While use of a silicone rubber sheet as a flexible membrane for establishing a vacuum is known, applicants contend that the method of the present invention that uses a transfer sheet of a Surlyn-like material for three dimensional thermal printing that is secured over the object to be printed by a silicone rubber sheet to create a vacuum is not known in the art. As a whole, the present method is not taught or suggested by the cited art. Therefore, the combination above cannot be maintained against claim 4. As a result, claim 4 is allowable.

Moreover, claim 4 is a dependent claim which is dependent on now allowable independent claim 1. Therefore, applicant submits that claim 4 is now allowable over the cited prior art.

VIII. Conclusion

Applicant submits that Claims 1-7 are allowable over the cited prior art. In view of the above, Applicants submit that pending Claims 1-4 are now in condition for allowance. Reconsideration of the Rejections and

Objections are requested. Allowance of Claims 1-7 at an early date is solicited.

If an extension of time is required for timely submission of this response, Applicant hereby petitions for an appropriate extension of time and the Office is authorized to charge Deposit Account 02-0900 for the appropriate additional fees in connection with the filing of this response.

The Examiner is invited to telephone the undersigned should any questions arise.

Respectfully submitted,

/david r. josephs/

Dated: November 13, 2006

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